

- (e) rejected claims 37, 38 and 41 as anticipated by DiGiacomo (U.S. Patent No. 6,085,831);
- (f) rejected claims 39 and 42 as anticipated by Snyder; and
- (g) rejected claims 19,20, 22 and 23 as obvious over Romero in view of DiGiacomo..

Based on the following amendments and remarks, the application is deemed to be in condition for allowance and action toward that end is respectfully requested.

IN THE CLAIMS

Please amend claims 1-42 as shown in the Appendix in "marked-up" form and in "clean" form below:

1. (amended) A thermal diffuser comprising:

a plate-like structure having a wall on its fringe, and being attached to a case of an electronic component by means of welding or bonding with the wall; and

a plurality of protrusions being arranged with spacing in a web form, the plurality of protrusions being mounted in a region which is surrounded with said wall, said case, and said plate-like structure and in which a heat medium is confined, the spacing among said protrusions forming a channel through which the heat medium recirculates.

2. (amended) A thermal diffuser comprising:

a housing having an outer wall capable of being thermally coupled with the a case of an electronic component which is subjected to heat exchange with an exterior; and

a plurality of protrusions being arranged with spacing in a web form on an inner wall of said housing in which a heat medium is confined, the spacing among said protrusions forming a channel through which the heat medium recirculates, and wherein

said housing has such a thermal resistance as to allow the heat exchange between the exterior and the channel.

3. (amended) A thermal diffuser comprising:

B1  
a frame integrated with a case of an electronic component which is subjected to heat exchange with an exterior; and

AK  
a plurality of protrusions being arranged in a web form with spacing on an inner wall of said frame in which a heat medium is confined, the spacing among said protrusions forming a channel through which the heat medium recirculates, and wherein

said frame has such a thermal resistance as to allow the heat exchange between the exterior and the channel.

4. (amended) The thermal diffuser according to claim 1, further comprising

a heat medium injection path formed in said wall of said plate-like structure and used for injection of the heat medium into the channel from the exterior.

5. (amended) The thermal diffuser according to claim 2, further comprising

a heat medium injection path formed in said wall of said plate-like structure and used for injection of the heat medium into the channel from the exterior.

6. (amended) The thermal diffuser according to claim 3, further comprising

a heat medium injection path formed in said wall of said plate-like structure and used for injection of the heat medium into the channel from the exterior.

7. (amended) The thermal diffuser according to claim 1, wherein

said plurality of protrusions being closely arranged in a region, the region being near a device or a circuit which is provided in the electronic component and is subjected to the heat exchange.

8. (amended) The thermal diffuser according to claim 2, wherein

said plurality of protrusions being closely arranged in a region, the region being near a device or a circuit which is provided in the electronic component and is subjected to the heat exchange.

9. (amended) The thermal diffuser according to claim 3, wherein

said plurality of protrusions being closely arranged in a region, the region being near a device or a circuit which is provided in the electronic component and is subjected to the heat exchange.

10. (amended) The thermal diffuser according to claim 1, wherein

said plurality of protrusions being arranged with uniform density in a region, the region being distant from a device or a circuit which is provided in the electronic component and is subjected to the heat exchange.

11. (amended) The thermal diffuser according to claim 2, wherein

said plurality of protrusions being arranged with uniform density in a region, the region being distant from a device or a circuit which is provided in the electronic component and is subjected to the heat exchange.

12. (amended) The thermal diffuser according to claim 3, wherein

13. (amended) The thermal diffuser according to claim 1, wherein  
said plurality of protrusions being arranged with uniform density in a region, the region being distant from a device or a circuit which is provided in the electronic component and is subjected to the heat exchange.

14. (amended) The thermal diffuser according to claim 2, wherein

top part(s) of all or a part of said plurality of protrusions has/have a shape and a size large enough to have said channel pass therethrough.

15. (amended) The thermal diffuser according to claim 3, wherein

top part(s) of all or a part of said plurality of protrusions has/have a shape and a size large enough to have said channel pass therethrough.

16. (amended) The thermal diffuser according to claim 3, wherein

top part(s) of all or a part of said plurality of protrusions has/have a shape and a size large enough to have said channel pass therethrough.

16. (amended) The thermal diffuser according to claim 1, wherein

all or a part of said plurality of protrusions has/have a partly contracted pillar or wedge shape.

17. (amended) The thermal diffuser according to claim 2, wherein

all or a part of said plurality of protrusions has/have a partly contracted pillar or wedge shape.

18. (amended) The thermal diffuser according to claim 3, wherein

all or a part of said plurality of protrusions has/have a partly contracted pillar or wedge shape.

19. (amended) The thermal diffuser according to claim 1, wherein  
said plurality of protrusions and/or said wall have a material, a shape, and a size such that  
recirculation of the heat medium is promoted by capillary attraction in the channel.
20. (amended) The thermal diffuser according to claim 2, wherein  
said plurality of protrusions and/or said inner wall have a material, a shape, and a size  
such that recirculation of the heat medium is promoted by capillary attraction in the channel.
- B/ 21. (amended) The thermal diffuser according to claim 3, wherein  
said plurality of protrusions and/or said inner wall have a material, a shape, and a size  
such that recirculation of the heat medium is promoted by capillary attraction in the channel.
- A/ 22. (amended) The thermal diffuser according to claim 1, further comprising  
a medium inserted in all or a part of sections of the channel, for increasing capillary  
attraction to the heat medium in the channel.
23. (amended) The thermal diffuser according to claim 2, further comprising  
a medium inserted in all or a part of sections of the channel, for increasing capillary  
attraction to the heat medium in the channel.
24. (amended) The thermal diffuser according to claim 3, further comprising  
a medium inserted in all or a part of sections of the channel, for increasing capillary  
attraction to the heat medium in the channel.

25. (amended)

The thermal diffuser according to claim 1, wherein

all or a part of said plurality of protrusions has/have one of a hole and a member, the hole being used for joining and/or coupling the thermal diffuser and said case, the member being used for fastening the thermal diffuser in order to maintain thermal coupling with said case.

26. (amended)

The thermal diffuser according to claim 2, wherein

all or a part of said plurality of protrusions has/have one of a hole and a member, the hole being used for joining and/or coupling the thermal diffuser and said case, the member being used for fastening the thermal diffuser in order to maintain thermal coupling with said case.

27. (amended)

The thermal diffuser according to claim 3, wherein

all or a part of said plurality of protrusions has/have one of a hole and a member, the hole being used for joining and/or coupling the thermal diffuser and said case, the member being used for fastening the thermal diffuser in order to maintain thermal coupling with said case.

28. (amended)

The thermal diffuser according to claim 1, further comprising

one of a member used for fastening the thermal diffuser in order to maintain thermal coupling with said case, and member(s) integrated with all or a part of said plurality of protrusions individually and used for joining and/or coupling the thermal diffuser and said case.

29. (amended)

The thermal diffuser according to claim 2, further comprising

one of a member used for fastening the thermal diffuser in order to maintain thermal coupling with said case, and member(s) integrated with all or a part of said plurality of protrusions individually and used for joining and/or coupling the thermal diffuser and said case.

30. (amended) The thermal diffuser according to claim 3, further comprising

one of a member used for fastening the thermal diffuser in order to maintain thermal coupling with said case, and member(s) integrated with all or a part of said plurality of protrusions individually and used for joining and/or coupling the thermal diffuser and said case.

31. (amended) The thermal diffuser according to claim 1, wherein

a total amount of the heat medium is set to such an amount that the heat medium steadily recirculates in a part of the channel, the part being most closely thermally coupled with the electronic component.

32. (amended) The thermal diffuser according to claim 2, wherein

a total amount of the heat medium is set to such an amount that the heat medium steadily recirculates in a part of the channel, the part being most closely thermally coupled with the electronic component.

33. (amended) The thermal diffuser according to claim 3, wherein

a total amount of the heat medium is set to such an amount that the heat medium steadily recirculates in a part of the channel, the part being most closely thermally coupled with the electronic component.



34. (amended) The thermal diffuser according to claim 1, wherein

said plate-like structure has a shape and a material such that the said plate-like structure has a desired degree of thermal coupling with the exterior or a specific member.

35. (amended) The thermal diffuser according to claim 2, wherein

said outer wall has a shape and a material such that the said plate-like structure has a desired degree of thermal coupling with the exterior or a specific member.

36. (amended) The thermal diffuser according to claim 3, wherein

the outer wall of said frame has a shape and a material such that the said plate-like structure has a desired degree of thermal coupling with the exterior or a specific member.

37. (amended) A radiator comprising:

a thermal diffuser comprising a plate-like structure having a wall on its fringe, and being attached to a case of an electronic component by means of welding or bonding with the wall; and a plurality of protrusions being arranged with spacing in a web form, the plurality of protrusions being mounted in a region which is surrounded with said wall, said case, and said plate-like structure and in which a heat medium is confined, the spacing among said protrusions forming a channel through which the heat medium recirculates; and

a radiating member thermally coupled with an outer wall of said thermal diffuser, for radiating heat to an exterior, the heat being transferred via said thermal diffuser.

38. (amended) A radiator comprising:

a thermal diffuser comprising a housing having an outer wall capable of being thermally coupled with the a case of an electronic component which is subjected to heat exchange with an exterior; and a plurality of protrusions being arranged with spacing in a web form on an inner wall of said housing in which a heat medium is confined, the spacing among said protrusions forming a channel through which the heat medium recirculates; and

a radiating member thermally coupled with an outer wall of said thermal diffuser, for radiating heat to the exterior, the heat being transferred via said thermal diffuser, and wherein

said housing has such a thermal resistance as to allow the heat exchange between the exterior and the channel.

39. (amended) A radiator comprising:

a thermal diffuser comprising a frame integrated with a case of an electronic component which is subjected to heat exchange with an exterior; and a plurality of protrusions being arranged in a web form with spacing on an inner wall of said frame in which a heat medium is confined, the spacing among said protrusions forming a channel through which the heat medium recirculates; and

a radiating member thermally coupled with an outer wall of said thermal diffuser, for radiating heat to an exterior, the heat being transferred via said thermal diffuser, and wherein

said frame has such a thermal resistance as to allow the heat exchange between the exterior and the channel.

40. (amended) A radiator comprising:

a thermal diffuser comprising a plate-like structure provided with having a wall on the fringing part its fringe, and being attached to a case of an electronic component by means of welding or bonding with the wall; and a plurality of protrusions being arranged with spacing in a web form, the plurality of protrusions being mounted in a region which is surrounded with said wall, said case, and said plate-like structure and in which a heat medium is confined, the spacing among said protrusions forming a channel through which the heat medium recirculates; and

a radiating member integrally formed on an outer wall of said thermal diffuser, for radiating heat to an exterior, the heat being transferred via said thermal diffuser.

41. (amended) A radiator comprising:

a thermal diffuser comprising a housing having an outer wall capable of being thermally coupled with the a case of an electronic component which is subjected to heat exchange with an exterior; and a plurality of protrusions being arranged with spacing in a web form on an inner wall of said housing in which a heat medium is confined, the spacing among said protrusions forming a channel through which the heat medium recirculates; and

a radiating member integrally formed on an outer wall of said thermal diffuser, for radiating heat to the exterior, the heat being transferred via said thermal diffuser, and wherein

said housing has such a thermal resistance as to allow heat exchange between the exterior and the channel.

42. (amended) A radiator comprising: